

REMARKS

Reconsideration and withdrawal of the rejections of the claimed invention is respectfully requested in view of the amendments, remarks and enclosures herewith, which place the application in condition for allowance.

I. STATUS OF CLAIMS AND FORMAL MATTERS

Claims 1-7, 15, 16 and 18-20 are pending in this application. The limitation of claim 14 has been entered into claim 1 and the more narrowing transitional language “consists” has been inserted into claim 1. As claims 14 and 17 would now become duplicate claims, these claims have been cancelled. Claim 18 and 19 have been amended to make minor corrections to the claim and claim 19 has been amended to be dependent on claim 1. New claim 20 adds the limitations of claims 5 and 6 into claim 19.

No new matter has been added by this amendment.

It is submitted that the claims, herewith and as originally presented, are patentably distinct over the prior art cited in the Office Action, and that these claims were in full compliance with the requirements of 35 U.S.C. § 112. The amendments of the claims, as presented herein, are not made for purposes of patentability within the meaning of 35 U.S.C. §§§§ 101, 102, 103 or 112. Rather, these amendments and additions are made simply for clarification and to round out the scope of protection to which Applicants are entitled.

III. THE 35 U.S.C. 103(a) REJECTION HAS BEEN OVERCOME

The only remaining rejections for the applicants claims are:

1. Claims 1-4 and 14-19 were rejected as allegedly being obvious by Onda et al., (U.S. Patent 4,091,205 – “Onda”).
2. Claims 5-7 were rejected as allegedly being obvious over Onda, *ibid.* in view of Hitchin et al. (GB 909 039 – “Hitchin”).

The applicants request reconsideration of these rejections for the following reasons:

In order to establish obviousness, all claim limitations must be taught or suggested by the prior art or be within the knowledge of those of skill in the art. However, as noted in the rejection, Onda does not teach the use of pulverized cellulose and does not reach a method wherein the first, second and third temperatures are 40°-50°C, 55°-60°C and 85°-90°C.

Pulverized cellulose was not used in Onda nor would there be any suggestion of using pulverized cellulose as starting material given the state of the art

While there is at least an explanation for the difference in temperature ranges, there is no explanation for the difference in starting materials, i.e. Onda is using *alkali cellulose* from *wood pulp*. This is not pulverized cellulose as is being used in the applicants' claimed process. Wood pulp is a dry fibrous material prepared by chemically or mechanically separating the fibers which make up wood (see definition from Wikipedia attached to this response) and alkali cellulose is the product which results from steeping wood pulp in sodium hydroxide (see definition from Answers.com).

To the extent that a reference can be found which teaches pulverized cellulose, this still does not account for the correcting the deficiencies of the Onda reference, i.e. one of ordinary skill in the art would not have been motivated to use pulverized cellulose in the process of Onda. As noted in Schur (U.S. Patent 1,964,772 – granted on **3 July 1934**), “the powdering of cellulose fiber is, however, a performance which calls for the expenditure of enormous quantities of energy when practiced in such instrumentalities as ball mills.” (see page 1, lines 23-27 of Schnur). A common problem associated with the milling process is the clumping of the finely divided particles. Even in Schur's improved process, there is the acknowledgement that additional pulverization may be necessary (see page 1, lines 89-94), which is now explicitly excluded in the applicants' claims.

Given these difficulties in working with pulverized cellulose, it was not surprising that Onda (and those of ordinary skill in the art) would choose to defer pulverization until the final step to obtain their powdered cellulose ethers, i.e. to eliminate the possibility that more than one pulverization would be necessary. The problems associated with pulverization persist for those of skill in the art to this day (see e.g. Glenn Rabenold's contribution to *Energy Breakthroughs* entitled “Pulverized Cellulose” which proposes the use of cellulose for forming alternative fuels – the section marked by the applicants' representative shows that Mr. Rabenold sees that “[t]he difficulty will be the pulverization of cellulose.”). Therefore, given the state of the art, one of ordinary skill in the art would have been directed away from using pulverized cellulose as the starting material.

Applicants have surprisingly found that by using this heretofore undesired form of cellulose for the formation of powdered cellulose ethers, an additional pulverization step was not necessary at the end of the process even after three separate chemical steps.

Neutralization step is not necessary in applicants' claimed invention

Even if were permissible to simply rearrange the process steps of Onda, the applicants' claimed invention still would not be taught by the applicants' invention as amended (i.e. with the use of the transition phrase "consists of")). Rearranging the process steps of Onda would still require a two stage neutralization step, i.e. a first step which employs 5 to 80% of an acid stoichiometrically required and then a second step of adding an additional amount of the acid to complete the neutralization.

The applicants' claimed process as amended contains none of these steps and there is no teaching from within Onda which would suggest the elimination of these neutralization steps.

Combination with Hitchin does not remedy the deficiencies of Onda

As claims 5-7 are ultimately dependent on claim 1, the rejection of claim 1 would stand or fall with claim 1. In addition, Hitchin is also deficient for similar reasons as with Onda, i.e. Hitchin is directed to conventional process of forming cellulose ethers which is not related to the applicants' process in that Hitchin is also using alkali cellulose as their starting material and then pulverizing at the end of their process.

Conclusion

As Onda alone or in combination with Hitchin does not teach the applicants claimed process as amended, the obviousness rejection can be withdrawn.

CONCLUSION

In view of the remarks and amendments herewith, the application is believed to be in condition for allowance. Favorable reconsideration of the application and prompt issuance of a Notice of Allowance are earnestly solicited. The undersigned looks forward to hearing favorably from the Examiner at an early date, and, the Examiner is invited to telephonically contact the undersigned to advance prosecution.

Respectfully submitted,
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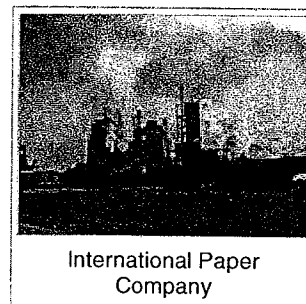
Wood pulp

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From Wikipedia, the free encyclopedia

Wood pulp is a dry fibrous material prepared by chemically or mechanically separating the fibers which make up wood.

Pulp can be either fluffy or formed into thick sheets. The latter form is used if the pulp must be transported from the pulp mill to a paper mill. Pulp which is shipped and sold as pulp (not processed into paper in the same facility) is referred to as **market pulp**. When suspended in water the fibers disperse and become more pliable. This pulp suspension can be laid down on a screen to form a sheet of paper, and this is the primary use for wood pulp. Wood pulp is the most common material used to make paper. The timber resources used to make wood pulp are referred to as pulpwood. Wood pulp comes from softwood trees such as spruce, pine, fir, larch and hemlock, and hardwoods such as eucalyptus, aspen and birch.



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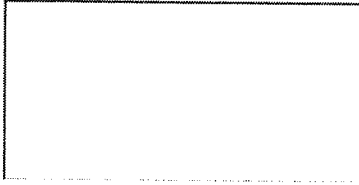
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History

Using wood to make paper is a fairly recent innovation. In the 1800s, fiber crops such as linen fibres were the primary material source, and paper was a relatively expensive commodity. The use of wood to make pulp for paper began with the development of mechanical pulping in Germany by F.G. Keller in the 1840s^[1]. Chemical processes quickly followed, first with J. Roth's use of sulfurous acid to treat wood, followed by B. Tilghman's US patent on the use of calcium bisulfite, $\text{Ca}(\text{HSO}_3)_2$, to pulp wood in 1867.^[2] Almost a decade later the first commercial sulfite pulp mill was built in Sweden. It used magnesium as the counter ion and was based on work by Carl Daniel Ekman. By 1900 sulfite pulping had become the dominant means of producing wood pulp, surpassing mechanical pulping methods. The competing chemical pulping process, the sulfate or kraft process was developed by Carl F. Dahl in 1879 and the first kraft mill started (in Sweden) in 1890.^[2] The invention of the recovery boiler by G.H. Tomlinson in the early 1930s^[1] allowed kraft mills to recycle almost all of their pulping chemicals. This, along with the ability of the kraft process to accept a wider variety of types of wood and produce stronger fibers^[3] made the kraft process the dominant pulping process starting in the 1940s.^[2]

Global production of wood pulp in 2006 was 160 million tonnes (175 million tons)^[4]. In the previous year, 57 million tonnes (63 million tons) of market pulp (not made into paper in the same facility) was sold, with Canada being the largest source at 21% of the total, followed by the US at 16%. Chemical pulp made up 93% of market pulp.^[5]

Manufacture of wood pulp



Sci-Tech Dictionary:

alkali cellulose

(ˈal-kəˈlī ˈsel-yəˈlōs)

(materials) Product of wood pulp steeped with sodium hydroxide; first step in manufacture of viscose rayon and other cellulose.

"alkali cellulose"

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UNITED STATES PATENT OFFICE

1,964,772

PRODUCTION OF PULVERIZED CELLULOSE

Milton O. Schur and Benjamin G. Hoos, Berlin,
N. H., assignors to Brown Company, Berlin,
N. H., a corporation of Maine

No Drawing. Application September 3, 1931,
Serial No. 561,001

9 Claims. (Cl. 92—20)

In the manufacture of certain ultimate products, it is desirable to use powdered cellulose as a filling or loading material. Thus, powdered cellulose may be advantageously used in the loading or filling of papers, fabrics, or the like, together with, if desired, a sizing agent. In combination with plastics, e. g., urea-formaldehyde or phenolic condensation products, the powdered cellulose furnishes body, resiliency, opacity, and machining qualities. In many of these connections, however, it is most important that the powdered cellulose be stable, i. e., maintain its colorlessness against the influences of light, moisture, air, and heat.

There are types of cellulose fibers which stand up well against atmospheric influences and against the action of heat without undergoing discoloration. For instance, powdered cotton fiber or powdered refined wood pulp of high alpha cellulose content are characterized by their permanency of color even when combined with plastics which are moulded into articles of the desired shape at elevated temperature. The powdering of cellulose fiber is, however, a performance which calls for the expenditure of enormous quantities of energy when practiced in such instrumentalities as ball mills. A large capital investment is required for such powdered equipment, which must be of large size for a given output of powdered product. Great care must constantly be exercised to avoid contamination of the powdered fiber by the material of construction of the powdering equipment.

We have discovered that a refined wood pulp may be transformed chemically to a pulverulent condition in which it possesses remarkable stability, even against the action of heat, despite the fact that considerable of its alpha cellulose content may be transformed into other forms of cellulose. The usual pulps of commerce, e. g., bleached sulphite or bleached soda pulp, are lacking in stability, to begin with, and this instability persists or is aggravated through a chemical treatment which lowers the alpha cellulose content of such fiber. We have discovered that a refined wood pulp of high alpha cellulose content is stable not only to begin with, but retains such stability even though its alpha cellulose content is materially reduced more especially by sufficiently drastic hydrolyzing treatment with various acid solutions to cause partial or complete pulverization. By the characterization "refined wood pulps" herein given, we mean pulps, such as sulphite or kraft, which have undergone special processing, including digestion in alkaline liquors, designed to increase their alpha cellulose content to at least about 93% and to whiten them. Such refined wood pulps are thus much freer from non-alpha cellulose components, including ligneous, resinous, and

coloring matter, beta and gamma celluloses, and the like, than the unrefined wood pulp. Consequently when subjected to acid-hydrolyzing treatment designed to embrittle such pulp and to convert it to a partially or completely pulverized condition, there is evidently insufficient color-generating substance formed from non-alpha cellulose components to give rise to discoloring tendencies, even though considerable alpha cellulose has been converted into other forms of cellulose. These altered celluloses are, from a practical point of view, as stable in the atmosphere and under the action of heat as the original alpha cellulose from which they were formed.

In accordance with our invention, therefore, we subject previously purified wood pulps of an alpha cellulose content of at least about 93% to the action of hydrolyzing aqueous liquors under conditions designed to pulverize the pulp fibers partially or completely. The hydrolyzing liquors are preferably of acid character, as acids function to embrittle the fiber in a highly satisfactory manner, especially when they are strongly ionized in water, as is true of mineral acids like sulphuric, hydrochloric, etc. A wide variety of time, temperature, and pressure conditions may be used in the acid solution treatment of the purified pulp. If the conditions chosen are such as only partially to pulverize the fiber, the pulverization may be completed in a ball mill or other suitable grinder, which, however, completes pulverization with the consumption of little mechanical energy on account of the friable state of the fiber.

We shall now recite illustrative procedures falling within the purview of our invention. Thick sheets of refined wood pulp, known as "drier sheets," may be used as the raw material. The refined wood pulp may, for example, have an alpha cellulose content of about 94.5% and be previously purified sulphite pulp. The sheets may be immersed in a large excess of sulphuric acid solution in the ratio of, say, 1 part of fiber to 20 parts of acid solution containing, say, 5% sulphuric acid, based on liquid. The solution may then be heated, as with live steam, to the boiling point under atmospheric pressure, which may be maintained for a period of, say, six hours. During the boiling operation, the sheets tend to disintegrate and yield a suspension of fine fibers, which may be allowed to settle. The supernatant acid solution may be decanted from the layer of cellulose, and the cellulosic slurry then washed free of acid solution with water. The washed mass may then be pressed free of easily removable water, and the resulting cake dried as in a heated chamber. The cake may then be subjected to a light rubbing action, as in a small-sized coffee mill, wherewith large quantities may

easily be converted into free-flowing powder with small power consumption. This powder is useful as a filler in products of the class hereinbefore mentioned.

- 5 Another example of procedure may be about as follows. Refined wood pulp of alpha cellulose content of 93%, prepared from a sulphate or kraft fiber base, may be pumped in aqueous slush form into a digester provided with an acid-proof lining, wherein it may be heated as, say, a 5% suspension
10 in a 2% sulphuric acid solution, until the pressure in the digester is 25 pounds gage per square inch. This pressure may be maintained for one hour, whereupon the contents of the digester may
15 be blown into a receiver, from which the slurry may be pumped to a filter press or into a centrifuge and wrung free of excess solution. The mass may then be subjected to a washing operation and pressed into cakes, which may either be dried and
20 reduced to free-flowing powder, as already described, or which may be charged directly into the beater, if it is to be used for papermaking purposes, without an intermediate drying. A powdered product so prepared without mechanical
25 treatment passes practically entirely through a 40-mesh screen, but it may be made to consist of particles of finer mesh by longer boiling in the acid solution, or through the use of stronger acid solution, higher temperature, mechanical means,
30 etc.

In the examples cited, the alpha cellulose content of the pulp dropped from the original values to about 75%,—a value much lower than the alpha cellulose present in the usual unrefined commercial wood pulps, like sulphite, soda, kraft, etc. Yet, as already indicated, this powder of low alpha cellulose content is more stable and much more useful than the mechanically powdered, unrefined wood pulp. The acid hydro-
35 lyzing treatment is thus accompanied by the embrittlement and pulverization of the fiber and a sharp decrease in alpha cellulose content. It has long been known that the acid treatment of cellulose fibers makes for embrittlement of the
40 fiber. Contrary to what was to be expected, however, the embrittlement of purified wood pulp by acid hydrolysis, even though accompanied by great loss in alpha cellulose, is not attended by impartation to the cellulose of instability, which
45 militates against the use of the powdered product in papermaking and in plastics moulded even at temperatures ranging from 125° to 180° C.

The digestion of unrefined or ordinary chemical wood pulps, such as sulphite, in alkaline
50 liquors to remove non-alpha cellulose components from the pulp and thereby to produce a pulp of higher alpha cellulose content, say one of an alpha cellulose content of at least about 93% has now been known for some time. The step of di-
60 gesting such refined wood pulps in acid-hydrolyzing liquors, for instance, in dilute mineral acid solutions, more than undoes the work of refinement effected by the alkaline refining liquors, but, contrary to expectation, the degradation products
65 of the alpha cellulose are of a different and more stable sort, particularly as regards color, than are the non-alpha cellulose components associated with the unrefined wood pulp. It is for this reason that despite the fact that we wind
70 up with a chemically powdered product whose alpha cellulose content may be much lower than that of the unrefined wood pulp, nevertheless our product is of greater value than the mechanically powdered, substantially undegraded unre-
75 fined wood pulp.

We claim:

1. A process which comprises refining preliberated cellulose pulp in an alkaline liquor to higher alpha cellulose content, and then hydrolyzing such refined pulp under conditions to degrade it to a powder whose alpha cellulose content is lower than that of the unrefined cellulose pulp used as raw material but whose color stability is greater than that of the mechanically pulverized unrefined cellulose pulp. 80
2. A process which comprises refining chemical wood pulp in an alkaline liquor to an alpha cellulose content of at least about 93%, and then hydrolyzing such refined pulp under conditions to degrade it to a powder whose alpha cellulose content is lower than that of the unrefined wood pulp used as raw material but whose color stability is greater than that of the mechanically pulverized unrefined chemical wood pulp. 85
3. A process which comprises chemically liberating cellulose pulp from raw cellulosic material and purifying it in an alkaline liquor to an alpha cellulose content of at least about 93%, and then digesting such purified pulp in an acid hydrolyzing liquor under conditions to degrade it to a powder whose alpha cellulose content is as low as about 75% but which has higher color stability than mechanically pulverized sulphite wood pulp. 90
4. A process which comprises first dissolving in an alkaline liquor non-alpha cellulose components, including ligneous matter and resins, from cellulose fiber, thereby increasing its alpha cellulose content, and then hydrolyzing such fiber under conditions to degrade it into a powder of an alpha cellulose content lower than that of the cellulose fiber used as starting material. 95
5. A process which comprises extracting in an alkaline liquor non-alpha cellulose components, including ligneous matter and resins from chemical wood pulp, thereby increasing its alpha cellulose content, and then subjecting the pulp to the action of an acid-hydrolyzing liquor under conditions to degrade it into a powder of an alpha cellulose content lower than that of the chemical wood pulp used as starting material. 100
6. A process which comprises refining wood pulp in an alkaline liquor to an alpha cellulose content of at least about 93%, and then digesting such refined pulp in a mineral acid solution under conditions to degrade it into a powder of an alpha cellulose content lower than that of the wood pulp used as starting material. 105
7. A process which comprises refining wood pulp in an alkaline liquor to an alpha cellulose content of at least about 93%, and then digesting such refined pulp in a sulphuric acid solution under conditions to degrade it into a powder of an alpha cellulose content lower than that of the wood pulp used as starting material. 110
8. A degraded, white, acid-pulverized cellulose pulp derived from raw cellulosic material purified to an alpha cellulose content of at least about 93%, said degraded, cellulose powder having an alpha cellulose content even less than that of an unpurified chemical wood pulp but having greater color stability than the unpurified chemical wood pulp. 115
9. A color stable white powder derived from pulp of at least about 93% alpha cellulose content by an acid treatment which lowers the alpha cellulose content in the powder. 120

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ENERGY BREAKTHROUGHS

<http://www.enviroalternatives.com>

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2008 Break-Throughs

EESstor Ceramic "Battery" - Texas company is working on an "energy storage" ultra-capacitor device made from ceramics. It's not technically a battery because it doesn't use chemicals. It can allegedly charge within 5 minutes (from a substation) with enough energy to move a car 500 miles on about \$9 worth of electricity — about 45 cents a gallon.

Nanotube Super Capacitor Battery - MIT researchers are developing a battery based on capacitors that utilize nanotubes for high surface area, enabling near instantaneous charging and no degradation. Estimating ~5 years to commercialization.

International Automated Systems - Utility scale solar presently in process of being commercially installed for first time; alleged to produce electricity at 3-5 cents per kilowatt-hour. Highly-efficient bladeless turbine has wide range of waste-heat-harnessing applications. Methanol production technique will draw CO2 out of the environment, reversing global warming. (<http://IAUS.com>)

SA thin film solar eclipses others - South African solar panels consist of a thin layer approximately five microns thick (a human hair is 20 microns thick) of a unique metal alloy that converts light into energy at a fraction of the cost. The photo-responsive alloy can operate on virtually all flexible surfaces. Expected in market in 2007.

LED Lights

- Larry Dobson -

Global warming is a fact, whether or not man-made. Deadly pollution is an undeniable product of mankind in hot pursuit of the latest technological fascination. Everywhere you look, the world is in a hell of a mess and accelerating. Once we realize the depth and extent of it, what can we do but feel like hopeless victims? Give up fighting it? Change focus? Thanks to you folks who reminded me of my contribution to the hysteria. it's hard to cold-turkey when what is happening seems so diabolic, so I may laps into occasional political fits of rage, especially when the gossip is too juicy to pass up.... but generally, I want to focus more on a positive slant to the news and more on energy, alternative society, organic living, wholesome stuff.

Economic mechanisms must of necessity change quite rapidly now, bringing unprecedented challenges and opportunities for fresh exciting new directions. We now experience huge changes, from human relations to the pulse-rate of the earth. Earth's magnetic poles are shifting, becoming considerably weaker, causing some scientists to predict a reversal of earth's magnetic polarity or rotational direction. The reason your day might feel too short is due to the unprecedented recent increase in our earth's resonant frequency 1 ½ times. The resonance of Earth (Schumann Resonance) has been 7.8Hz since first detected in 1953, yet, since 1980 it has risen to over 12Hz. This means that 16 hours now equate to a 24 hour day. Time is speeding up! (for this and other profound revelations, check out <http://home.iae.nl/users/lightnet/world/shift.htm> All the prophesied earth changes are happening. Such shifts are happening everywhere, you name it. And opportunities just need someone to knock on their door to open all sorts of new possibilities. It's time to JUST DO IT

We can radically improve conventionally known technologies, up and down the line. For example, in the middle of the Tenasket Barter Fair last fall was a light tower that lit up the night like a beacon with strings of LED lights of all colors. The entire display of 360 lights consumed a mere 30 watts of power from a battery. This is the new

revolution in lighting about to sweep the world. Much of the credit for this goes to a Japanese inventor's recent breakthrough in producing new LED colors and mixing blue from the ultraviolet end of the light spectrum with red and green to produce white.

Lighting accounts for over 20 percent of all electricity consumed in the US. On the other hand, LEDs use only 20 percent or less of the energy consumed by traditional lighting. This implies that LEDs could have the single biggest impact on demand for energy in the next two decades (but see even more radical breakthroughs below)--and possibly as much impact on the problem of global warming. Another superior feature is that because they operate cold, they don't burn out like current lights. There are a host of new manufacturers and distributors of ultra-bright LED lights, such as The LED Light.com, the future of Lighting, <http://www.theledlight.com/> ; Prime Light, <http://www.prime-light.com/> ; Lumileds, "Light from Silicon Valley ~ Lumileds welcomes you to a world of never-before possible lighting", <http://www.lumileds.com/> .

A major breakthrough in electric motor efficiency is currently being manufactured in Japan by Japan Magnetic Fan Company and the inventor, Kohei Minato.

http://www.newmediaexplorer.org/sepp/2004/04/05/kohei_minato_and_the_japan_magnetic_fan_company.htm

"Minato's motors consume just 20 percent or less of the power of conventional motors with the same torque and horse power. They run cool to the touch and produce almost no acoustic or electrical noise. They are significantly safer and cheaper (in terms of power consumed), and they are sounder environmentally.

The implications are enormous. In the US alone, almost 55 percent of the nation's electricity is consumed by electric motors. While most factory operators buy the cheapest motors possible, they are steadily being educated by bodies like NEMA (National Electrical Manufacturers Association) that the costs of running a motor over a typical 20-year lifespan comprise a purchase price of just 3 percent of the total, and electricity costs of 97 percent. It is not unusual for a \$2,000 motor to consume \$80,000 of electricity (at a price of 6 cents per kilowatt hour).

Since 1992, when efficiency legislation was put into place at the US federal level, motor efficiency has been a high priority -- and motors saving 20 percent or so on electrical bills are considered highly efficient. Minato is about to introduce a motor which saves 80 percent, putting it into an entirely new class: The \$80,000 running cost will drop to just \$16,000. This is a significant savings when multiplied by the millions of motors used throughout the USA and Japan -- and eventually, throughout the world.

The devices

Minato's invention and its ability to use remarkably less power and run without heat or noise make it perfect for home appliances, personal computers, cellphones (a miniature generator is in the works) and other consumer products.

The magnetic motor will be cheaper than a standard motor to make, as the rotor and stator assemblies can be set into plastic housings, due to the fact that the system creates very little heat. Further, with the motor's energy efficiency, it will be well suited for any application where a motor has limited energy to drive it. While development is still focused on replacing existing devices, Minato says that his motor has sufficient torque to power a vehicle.

With the help of magnetic propulsion, it is feasible to attach a generator to the motor and produce more electric power than was put into the device. Minato says that average efficiency on his motors is about 330 percent.

Mention of Over Unity devices in many scientific circles will draw icy skepticism. But if you can accept the idea that Minato's device is able to create motion and torque through its unique, sustainable permanent magnet propulsion system, then it makes sense that he is able to get more out of the unit than he puts in in terms of electrical power. Indeed, if the device can produce a surplus of power for longer periods, every household in the land will want one.

"I am not in this for the money," Minato says. "I have done well in my musical career, but I want to make a contribution to society -- helping the backstreet manufacturers here in Japan and elsewhere. I want to reverse the trends caused by major multinationals. There is a place for corporations. But as the oil industry has taught us, energy is one area where a breakthrough invention like this cannot be trusted to large companies."

Minato was once close to making a deal with Enron. But today, he is firmly on a mission to support the small and the independent -- and to go worldwide with them and his amazing machine. "Our plan is to rally smaller companies and pool their talent, and to one day produce the technology across a wide range of fields."

Along similar lines, Michael Brady, inventor of the Perendev Magnetic Motor, which also generates electricity, is now being manufactured in Germany. "The smallest motor is capable of producing 20 kW, enough for a home. The largest can produce up to 4 megawatts, enough for a small power station." It is impossible to overstate the ramifications of this breakthrough, if it indeed works as claimed and gets on the market. Immediately, the peak oil crisis will be a temporary inconvenience rather than a world disaster.

References

<http://www.perendev-power.com>

For more than you ever wanted to know about other such magnetic motor devices, check out:

Magnetic Motors (general index)

<http://FreeEnergy.GreaterThings.com/Directory/MagneticMotors/>

To view the extent of more cutting-edge energy technology, visit the fascinating website, <http://www.zpenergy.com> ~ Zero-pollution energy – the New Energy Revolution.

"This is a NEWS PORTAL dedicated to experimental research on REVOLUTIONARY ENERGY TECHNOLOGIES. We propose to you to use this site as THE concentrator of choice for valuable news on the fascinating but still controversial subject of over-unity (O/U) fuel-less energetics (devices tapping the Zero Point Energy (ZPE)/ Vacuum/ Cosmic/ Ambient energy fields) and related. We want to let the general public know that this is an active field and good progress is made towards validating this technology and bringing the first commercial operational device to the market."

How about cold fusion? Remember the excitement and debunking around this subject? Now a respected Nuclear Physicist, Rene' Louis Vallee, says it is real and immanently practical. "Thanks in large measure to the research achievements of the past decades, which led to the discoveries of subexcited neutron and subexcited particles, it seems clear that clean nuclear fusion could now solve a major energy problem – the production of electricity – and it could do so with a valuable knowledge – the so called Grand Unified Synergetics Theory "Gust" – and with entirely acceptable environmental hazard."

Vallee's physics is behind the technology being tested by Jean-Louis Naudin, reported in humble scientific understatement in Naudin's web site : <http://www.jlnlabs.org>

He just posted the exciting results of tests on a new configuration of a clean nuclear fusion generator: Successful tests run with the new VSG v3.1 (Energy efficiency 253%) According to Naudin, "This experiment is fully based on the Prof René-Louis Vallée Synergetic theory. The purpose of this experiment is to find a simple and reproducible device which is able to produce the nuclear reaction claimed by the Prof R.L. Vallée. The main material used in this device is a pure carbon rod. Here, the carbon is not consumed by the reaction; it acts as a pump vs the Vacuum EM energy.

So, according to the Prof Vallée theory, the required condition to get the Synergetic effect is :

1. To align the fields of the electrons and the nucleus of the carbon atoms by the use of a colinear E-Field and B-Field,
2. the energy of external photons (g) is used to absorb the kinetic energy of the electrons,
3. so, the stopped electrons can be attracted by the carbon nucleus,
4. a nuclear reaction begins: the Carbon is transmuted into radioactive Boron (which has a radioactive decay of 20ms)
5. then, the vacuum energy is tapped by the nucleus and the Boron is transmuted back to Carbon while a strong pulse of 13 Mev is sent (see the reaction below) .

This process is the called "Capture PROTELF " (PROTon - EElectron Fusion) process by the Prof R.L. Vallée. A such process is able to produce up to 2.988 GW of Free Energy per gram of Carbon used, while the carbon is not consumed...

These tests of the VSG v2.0 are very interesting and need to be developed deeply. If the effects measured during these tests are not a simple measurement artifact, they can be directly related to the Prof R.L. Vallée Synergetic theory and thus, this can be a real breakthrough and opens a new path in free and clean energy production.

You will find all the photos, schematic diagrams, scope pictures and the tests results in Naudin's web site at : <http://jlnlabs.imars.com/vsg/index.htm>

*So why are we not seeing all of these breakthrough technologies on the market?
Why do we read nothing about them in the media and Department of Energy website?
-- Larry Dobson*

ACCIDENTAL INVENTION POINTS TO END OF LIGHT BULBS

By Bjorn Carey
LiveScience
October 21, 2005

http://www.livescience.com/technology/051021_nano_light.html

The main light source of the future will almost surely not be a bulb. It might be a table, a wall, or even a fork. An accidental discovery announced this week has taken LED lighting to a new level, suggesting it could soon offer a cheaper, longer-lasting alternative to the traditional light bulb. The miniature breakthrough adds to a growing trend that is likely to eventually make Thomas Edison's bright invention obsolete. LEDs are already used in traffic lights, flashlights, and architectural lighting. They are flexible and operate less expensively than traditional lighting.

Happy accident

Michael Bowers, a graduate student at Vanderbilt University, was just trying to make really small quantum dots, which are crystals generally only a few nanometers big. That's less than 1/1000th the width of a human hair. Quantum dots contain anywhere from 100 to 1,000 electrons. They're easily excited bundles of energy, and the smaller they are, the more excited they get. Each dot in Bower's particular batch was exceptionally small, containing only 33 or 34 pairs of atoms.

When you shine a light on quantum dots or apply electricity to them, they react by producing their own light, normally a bright, vibrant color. But when Bowers shined a laser on his batch of dots, something unexpected happened. "I was surprised when a white glow covered the table," Bowers said. "The quantum dots were supposed to emit blue light, but instead they were giving off a beautiful white glow."

Then Bowers and another student got the idea to stir the dots into polyurethane and coat a blue LED light bulb with the mix. The lumpy bulb wasn't pretty, but it produced white light similar to a regular light bulb. The new device gives off a warm, yellowish-white light that shines twice as bright and lasts 50 times longer than the standard 60 watt light bulb.

This work is published online in the Oct. 18 edition of the Journal of the American Chemical Society.

Better than bulbs

Until the last decade, LEDs could only produce green, red, and yellow light, which limited their use. Then came blue LEDs, which have since been altered to emit white light with a light-blue hue. LEDs produce twice as much light as a regular 60 watt bulb and burn for over 50,000 hours. The Department of Energy estimates LED lighting could reduce U.S. energy consumption for lighting by 29 percent by 2025. LEDs don't emit much heat, so they're also more energy efficient. And they're much harder to break. Other scientists have said they expect LEDs to eventually replace standard incandescent bulbs as well as fluorescent and sodium vapor lights.

If the new process can be developed into commercial production, light won't come just from newfangled bulbs. Quantum dot mixtures could be painted on just about anything and electrically excited to produce a rainbow of colors, including white. One big question remains: When a brilliant idea pops into your mind in the future, what will appear over your head?

Energy's new spin
Underwater windmills in NYC create invisible solution

May 22, 2006

<http://www.timesargus.com/apps/pbcs.dll/article?AID=/20060522/NEWS/605220358/1002/EDUCATION05>

By David Ho Cox News

NEW YORK - As consumers worry over an uncertain energy future, a Virginia company is eyeing an unusual untapped power source: the rivers of the Big Apple.

Within weeks, Verdant Power plans to submerge experimental turbines in the East River off the coast of Roosevelt Island, a slice of land squeezed between Manhattan and Queens. Resembling and working much like stout underwater windmills, the six 15-foot-tall turbines will draw energy from tidal currents to power a nearby supermarket and parking garage.

The company calls the project the first to use multiple underwater turbines to create usable power. Backers say the technology could ultimately provide a reliable, environmentally friendly and largely invisible solution to many global energy needs. "It's very, very green energy," said Dean Corren, the company's director of technology development. "There's a lot of energy in that flowing water. Our goal is to capture a small amount of that." Traditional hydropower from dams, where water is trapped at a high level and released, provides about 7 percent of the nation's electricity, but worries over damaging river environments and harming migrating fish have hindered new development.

The "hydro-kinetic" or "in-stream" technology works by submerging turbines into the natural path of moving water, such as a river, canal or deep ocean current.

"Fish and marine mammals can easily swim around," said George Hagerman, a Virginia Tech researcher who co-authored a study on in-stream energy issued this month. "It doesn't have anywhere near the impact of a dam."

Learning lessons from the wind industry, where large windmill blades have killed birds, projects such as the East River experiment include extensive monitoring to ensure fish are not harmed. The blunt rotor blades, spanning more than 16 feet tip to tip, will turn at a slow 32 rpm. Each turbine, anchored to bedrock and widely spaced in 30 feet of water, will work in both directions to accommodate reversing tidal currents. The technology is part of a growing effort to harness new forms of water energy, including using the motion of wind-driven ocean waves and "lunar power," the moon's gravitational effect on tides, Hagerman said.

While firms in the United Kingdom are often leading the way, advocates of the technology see vast untapped potential in the U.S., with its extensive coastal waters and numerous rivers and waterways. With rising fossil fuel prices, alternative energy has lately become big business. Wind power will likely produce enough electricity in the U.S. to run 2.3 million homes this year, according to the American Wind Energy Association. Texas officials announced plans on May 12 to build the nation's largest offshore wind farm in the Gulf of Mexico, with up to 170 windmills generating 500 megawatts of electricity - power for 125,000 homes.

In comparison, new forms of hydropower are just getting started. Verdant's 18-month test starting this summer should produce up to 200 kilowatts at peak capacity. If the test succeeds, the next stage in 2010 would use up to 300 improved turbines generating enough power for 8,000 New York homes. With a commercial deployment three times larger than that, New York could earn the title of the city powered by the most locally produced renewable energy, said Trey Taylor, president of Verdant Power, which launched in 2000. He said that while river turbines will likely never serve more than a tiny fraction of the city's energy needs, the technology has advantages over other renewable sources.

"The wind doesn't always blow and the sun doesn't always shine," Taylor said, but the new forms of hydropower are very reliable, running day and night.

He said the submarine turbines also are out of sight, avoiding conflicts like the one in Cape Cod, Massachusetts, where residents oppose a proposed wind farm, saying it would spoil scenic views. The river power also is produced locally, adding security and savings by replacing electricity transmitted from distant power plants, Taylor said. With interest from the Brazilian government, the company has a team scouting locations in the Amazon basin, where river turbines could replace diesel generators used in about 1,000 villages. The company has another project in Canada and plans to deploy turbines in man-made canals and aqueducts in California.

For now the more modest action is on Roosevelt Island, where Verdant Power's control room by the East River is a metal cargo container stuffed with electronics. It is about 20 feet from the Gristedes supermarket's deli section, soon to be chilled for free with river power. The company had to overcome a series of delays and federal and local government hurdles. Taylor said his company chose New York in part because its tough regulatory environment would be a "learning process." Corren predicted new hydropower will grow like wind power, while avoiding that industry's mistakes.

"There's no such thing as a 100 percent clean source of energy," he said, "but this is as close as you can get."

Even the ThomasNet Industrial Market Trends is bullish on alternative energy.

http://news.thomasnet.com/IMT/archives/2006/05/renewable_energy_outlook_solar_wind_dominates_growth.html?WT.mc_t=nlmt&WT.mc_n=6161

In 1850, about 90 percent of the energy consumed in the U.S. was from renewable energy resources, according to

<http://www.enviroalternatives.com/energybreakthroughs.html>

the Energy Information Administration (EIA). Now the U.S. is heavily reliant on the nonrenewable fossil fuels: coal, natural gas and oil. In 2004, about six percent of all energy consumed and about nine percent of total electricity production was from renewable energy resources.

"John Benner, with the Colorado-based National Center for Photovoltaics, says the key to solar power is increasing the efficiency of the photovoltaic cells as they turn light into energy: "We are designing materials at the atomic levels and assembling them in a way that is able to essentially quadruple the efficiency relative to what's commercially available today."

"Scientists and experts expect about a 50 percent reduction in the cost of solar energy in the next 10 years."

...and these interesting facts about lawnmowers (& chainsaws & weed-eaters, & outboard motors, etc.)

Gallon for gallon — or, given the size of lawnmower tanks, quart for quart — the 2006 lawn mower engines contribute 93 times more smog-forming emissions than 2006 cars, according to the California Air Resources Board. In California, lawn mowers provided more than 2 percent of the smog-forming pollution from all engines.

Six million new combustion-engine lawn mowers are sold each year in the United States. Consider the collaboration of hydrocarbons and nitrogen oxides from a push mower's exhaust and, hey, you've got smog!

MORE GOOD NEWS FROM THE FORFRONT OF THE HYDROGEN ECONOMY:

From: <http://www.sciam.com/article.cfm?chanID=sa006&articleID=00091FE0-9F9D-1446-9A6283414B7F0000&colID=5>

"Light Work"

Better solar nanotubes to split water for hydrogen

By Eric Smalley

The path to the hydrogen economy is getting visibly brighter--literally. Nano-tubes that break apart water molecules to liberate hydrogen can now do so more efficiently and could soon use the optical spectrum of sunlight. In dissociating water with sunlight, engineers have available three technologies: One is solar cells, which hold the record for water-splitting efficiency but are comparatively expensive. Another approach uses microorganisms, which are inexpensive but so far produce only minuscule amounts of hydrogen. The third option is photocatalysis, which relies on momentarily freed electrons in a semiconductor. Electrons that encounter water molecules replace the electrons in the bonds between hydrogen and oxygen. They thus break water apart and generate hydrogen gas. Photocatalysts are potentially less expensive than solar cells and produce more hydrogen than microorganisms.

...continued at Scientific American Digital

Summarizing the article...

It continues by stating that recent advances using titanium dioxide nanotubes have increased efficiencies five times and have achieved a 12% conversion rate for ultra-violet light to hydrogen. Two teams (One at University of Texas and the other at Penn State) have begun formulating titanium nanotubes that respond to visible light -- which of course is where most of the sun's solar energy pay-load is located in.

The next step researchers say is coming up with a nanotube material that has a high efficiency in pure visible light. If this can be achieved -- and these promising new advances suggest that it can -- then an average American suburban rooftop could generate the hydrogen equivalent of 11 liters of gasoline per day if it were coated with this material.

Hydrogen based fuel enhancement systems for your car are on the market now!

Here's a link to get tips on **improving your gas mileage**: <http://www.super-gas-mileage.com/>

I have found that coasting as often as possible gives me 5 - 10 miles per gallon more!

30 years ago a new mileage record was set by a car (with internal combustion engine) that coasted most of the time. It got 2,000 mpg!

Hydrogen in your tank ~ can this be real? Why doesn't the increased electric load (electrolysis of hydrogen) on the relatively inefficient automobile alternator more than offset the increased fuel efficiency? The answer seems to be mostly in the increased combustion speed and efficiency the hydrogen/oxygen creates in the cylinders.

http://savefuel.ca/index_buttons.html#top

Improve your fuel economy with **supplemental hydrogen**.

"Are You Sick And Tired of Paying Through The Nose At the Gas Pumps?

If You're Fed Up, Here's A Low-Cost Solution That will Save You 21% or More With Every Fill-Up!"

"There are several companies distributing such systems: <http://www.waterfuelconverters.com> , <http://www.savefuel.ca> , <http://www.hydrogen-boost.com> Each company sells a complete system capable of producing hydrogen based fuel, on-demand, to be used to enhance gasoline in Sedans, Coupes, SUV's, and Hybrids. Each company promotes different gas mileage improvement result, but independent of particulars, the result of using any of the systems is an increase in gas mileage to a substantial degree."

~~~~~  
For more far-out research in the hydrogen economy, visit Whidbey's own Doctor Elijah's webpage, and get on his newsbetter list:

[http://www.doctorelijah.org/wst\\_page2.html](http://www.doctorelijah.org/wst_page2.html)

### **Pulverized Cellulose**

*Pulverized cellulose combined with methane and with elemental hydrogen can form liquid hydrocarbon for fuel.*

- Glenn Ellwood Rabenold -

I have designed a means to combine pulverized cellulose with methane and with elemental hydrogen to form liquid hydrocarbon. The methane can come from any source available, coal methane (natural gas) or biomethane. The hydrogen can come from solar. Using methane as the bulk catalyst, only a little pure hydrogen will be necessary. Pressurized methane combined with pulverized cellulose and small amounts of hydrogen will cause the following condition.

Cellulose is a long chain sugar. Shortening the hydrocarbon chain will cause a tendency to liquify. Once liquid hydrocarbon is created, precise formation of hydrocarbon fuel can be done. Because this process will be chemical, we do not have to worry about forming hydrocarbons toxic to life. Gasoline is toxic to life. Pressurized Methane is a catalyst all by itself. The pressure is equivalent of heat. Pressure will have to be maintained or the methane will not penetrate all of the cellulose. A vacuum should probably be formed first, to evacuate all useless gas. Hydrogen will assist in reaction. It is highly reactive. This catalyst, eventhough it depletes, becomes part of the final fuel and thus is well used. Ultimately, the reaction will stabilize according to the number of carbon atoms to the number of hydrogen atoms. However, in order to get the hydrogen to penetrate, more hydrogen may have to be present than will create this final optimum balance between hydrogen and carbon.

I propose that we accept whatever fuel results. Using the minimum methane and hydrogen to get complete reaction from pulverized cellulose, will create a stable length carbon chain. I do not think that length of chain will be below pentane, which is a liquid at gas tank pressure. It is not practical to make methane from waste and then try to use the remaining cellulose to combine it with methane. I have measured the ash content of human waste, via heating over an open fire. It is quite high. This experiment is non-toxic and simple to do. It can be done without the elemental hydrogen to start with. It is possible that the pressurized methane will be sufficient as a catalyst. Storage of hydrogen to be used in pure form is touchy. It is more caustic than concentrated Sulfuric Acid. Hydrogen batteries have been developed. I think it is wise to use SOME hydrogen eventually, just to get in on the hydrogen economy. Hydrogen will certainly substitute for methane.

Despite not having a prototype, I am an inventor and have tested my visualization with reality. It is quite good. I have approximately a 98% accuracy, so far. Here is not the best place, but I would like to add information about pressurization. Methane is not usual atmosphere. The pressurization of methane with cellulose will create a completely different medium for the catalytic function of elemental hydrogen than would atmospheric action.

First step will be to find at what point the pressurization of methane into a container with cellulose will build up pressure. For a while the pressure will be absorbed by the spontaneous reactions occurring. At the point at which a pressure can be maintained (an equilibrium, so to speak), hydrogen should be injected to again start up chemical reaction. The pressure of methane prior to hydrogen injection should be comfortable but not too high. High pressure will be an energy for reaction all by itself, but the energy invested in high pressure is much higher than for comfortable pressure.

"Stirring" of the contents may be sufficient to create more chemical reaction to take the overall reaction to sufficient fluidity to go to completion. Once there is sufficient fluid the "binding sites" for the overall chemical reaction will be present. This would be with stirring.

If pressure cannot be maintained, due to ongoing reactivity of methane, stirring will be necessary to even out the carbon number of the hydrocarbons formed. Centrifugal force instead of pressure cannot be ruled out. High spin will create centrifugal force.

My theory is based on the fact that methane is quite reactive. Under prolonged exposure, methane will form an

equilibrium with long chain hydrocarbon fluids to reduce the average length of the carbon chains. Under pressurized conditions, methane will spontaneously form methanol when combined with atmospheric gas. That this reaction proceeds without loss of btus is a SEEMING violation of the second law of thermodynamics. Instead of heat, the pressurization is the energy input. This theoretical fact, is the theory behind the effectiveness of my "invention". The resulting Methanol is not pressurized, while the starting methane most definitely is.

The difficulty will be the pulverization of cellulose. Cellulose, in powdered form, actually tastes like a sugar. The human body can digest powdered cellulose when it cannot digest bulk cellulose. I do not, actually, have any good ideas about how to render the cellulose as split apart as possible. I suppose it would be possible to heat the cellulose in a methane atmosphere until it breaks apart.

It appears that my University of Rochester page has been taken down at the University level. I checked almost all of my webpages for accuracy, in terms of whether they pulled up or not.

This concerns me because I have found a systematic effort to remove the earlier simple pages off the web that concern themselves with easy synthesis of fuels. It seems the Universities are interested in the large bucks associated with complicated research. However, it is clear to me that they are directly killing the United States of America by doing so.

I hope you can find more simple fuel synthesis pages. I am quite sure that methane to methanol proceeds spontaneously under pressure and the exact oxygen content of atmosphere. The amount of atmosphere must be exact so as to not provide extra oxygen available to this reaction. Universities have been slow to allow that pressure itself provides exothermic conditions, that it is an energy source unto itself to impell reaction.

I would consider applying the gasification technology available in fuel cell technology and use the same equipment with a different feed, so that this technology can be used to gasify whatever liquid ensues from my liquefaction of cellulose plan.

Once you liquefy cellulose, you can feed the resulting fluid through a fuel-cell gasifier and separate the hydrogen out. Later on, this gasification can be used to make methanol or ethanol. First, the hydrogen should be used in a fuel-cell.

In the McGraw-Hill Encyclopedia of Science and Technology, under alcohol, you will find an interesting article on the synthesis of methanol. They speak of gasification of raw material and the separation of synthesis gases, CO and H<sub>2</sub> from those gases, presumably via centrifuge. They say all of these "plants" are costly.

Synthesis of methanol from methane should be spontaneous under pressure (with compressed atmosphere at a specific content ratio).

I am sure the pressurized methane will be absorbed by the cellulose. Pressure will not be maintained despite continuous inflow of methane. THAT I am sure of. Methanol is an advantageous resultant in that it has the highest amount of oxygen per amount of carbon. You have the same number of carbon atoms as oxygen atoms in Methanol. This roughly corresponds to the ratio present in the glucose building block. The addition of hydrogen, via methane, should decrease the likelihood of water formation and increase the likelihood of methanol formation. In addition, the bonds between glucose molecules, forming the cellulose matrix bond at the external oxygen atoms, each sharing an oxygen molecule. This reduces the hydrogen in cellulose, compared to glucose, but increases the ratio of carbons to oxygen.

My conclusion is that the reaction can still occur. The high amount of oxygen is comparable to the high amount of oxygen in Methanol. In fact, the tendency will be to have extra carbons instead of extra oxygens. That may cause part of the reaction to go towards Ethanol, as Ethanol has twice the number of carbons to oxygen atoms.

Methanol is CH<sub>3</sub>-OH  
Ethanol is CH<sub>3</sub>-CH<sub>2</sub>-OH

I can't draw glucose and cellulose here. You'll have to look it up. The same encyclopedia I mentioned will be useful in this. Glucose has a normal looking benzene type ring, but it is not aromatic. Instead of one carbon in the ring is a single oxygen, with no other bonds. At all of the carbons there is an H and an OH bonded, except one. At that carbon is a CH<sub>3</sub> molecule.



It still looks like the equation looks good for converting cellulose to methanol. The oxygen carbon ratio is favorably the same. I'll continue to research. Cellulose will not go to Ethanol with conservation of oxygens. There will be surplus oxygens. The LIKELY resultant will be a predominantly Methanol liquid, with some Ethanol. Again, my latest conclusion is that water will not be likely with the infusion of carbon and hydrogen. None of the incoming compounds contain oxygen.

The dry weight of plants is generally assessed as 50% cellulose, 25% hemicelluloses, and 25% lignin. The hemicelluloses are also a polysaccharide, so the essential building block is still glucose.

Therefore, the ratios of oxygen to carbon will be the same. That ratio is effectively that of Methanol.

On the other hand, lignin ratios are different. Those ratios of carbon to oxygen favor the formation of Ethanol. There is almost exactly twice the number of carbons as there are oxygens. This is the same as for Ethanol.

Therefore, it looks from here, that under ideal conditions, your resultant fluid will be 3/4 Methanol and 1/4 Ethanol.

An article said that there is a difference between annual and perennial plants in terms of the ration of the hemicelluloses. Annual plants are said to have up to 1/3 hemicellulose. I have to assume that the 1/4 lignin is still the same, or close to the same.

The hydrogen input, via methane, will favor this reaction, AS there are twice the number of hydrogens in glucose as there are carbons. In the bound form of glucose, in cellulose filaments, there is one less hydrogen due to the shared oxygen AT EVERY BOND. These number of bonds vary. However, the number of hydrogens can never exceed the number present in the most simple chain, which is ----- 10 hydrogens per 5 carbon atoms. In the ring, one carbon is substituted by an oxygen, thus preventing an aromatic ring.

My chemistry calculations are occurring online (a joke). Twice the hydrogens per carbon is not good, considering there is so much oxygen present. You may need the pure hydrogen, after all.

On long straight carbon chains such as gasoline and diesel there are mostly CH<sub>2</sub> bonds. However, the number of oxygens means that you will have to use up the oxygens present in the products Methanol and Ethanol. The amount of both will be directly measured by the amount of oxygen chemically bound by the raw material being processed.

As the Methane is introduced, the pressure will cause the following reaction.

All of the methane introduced will be converted to Methanol. The oxygen will be stripped from the cellulose and lignins. Since lignin is an aromatic and since there is conservation of hydrogens (in the above reaction), it may be advisable to schedule the introduction of pure hydrogen as soon as possible to measure the increase in efficiency.

At complete utilization of the oxygens present, the remaining one half of the carbons can be available for high grade fuels such as gasoline and diesel formation. For that remaining reaction, the exact amount of whatever chain length desired can be tailored by the amount of EXTRA methane introduced. The carbon to hydrogen ratio is one to two in chain glucose, therefore one methane molecule will have to be introduced for every gasoline or diesel molecule produced.

Considering that the 1/4 lignin is twice the number of carbons per oxygen, you have some margin for error. It looks as though you will have to introduce 1 part methane (by fuel measure) to produce two parts liquid fuel, VERY ROUGHLY.

The hydrogen will be very valuable is a continuous feed catalyst. The hydrogen will eventually be able to be mixed with methane without any toxicity problems. It should be possible to add pure hydrogen at a percentage that decreases the pressure necessary to compress methane. There should be such a point. It will only be for an exact combination. However, since you want to keep the hydrogen portion down, I would look at the small amounts of hydrogen for this effect. For now, you need ABSOLUTELY no more than 10% hydrogen in the methane hydrogen mix. It is nice that the amounts can be determined chemically. The hemicelluloses vary, one to another, so you will want to determine the exact ratios of methane to hydrogen experimentally. Each dry weight plant material will have its ratios of hydrogen to carbon to oxygen.

In summation, the dry weight will contribute one half of the fuel value and the introduced methane will contribute one half of the fuel value. The resultant fuels, however, will have the following benefits:

- a) All of the plant dry weight will have been converted to liquid fuel
- b) All of the methane will have been converted to liquid fuel that is easy to store and use.

In summation, it should work. The only difference is that it is going to use more methane to produce the final result than I predicted. However, ALL of the methane used will return in a usable fuel. It is desirable to convert methane to methanol for usability reasons, anyway, when considering methane for a liquid fuel. In my invention the only difference is that the oxygens come from cellulose instead of from compressed air. The benefits of doing so show up in the equations. You get TWICE the fuel for doing so.

The final resultant will be somewhat complicated by the fact that methanol and ethanol are not soluble in gasoline and diesel. The resultant chemistry will tend toward solubility of the two sets of fluids. I do not know what to do about this. It may not matter. They may simply separate. You will have to calibrate carefully, anyhow, as you near the final stages of production. The ratios are everything. Your energy for reaction comes from pressure and elemental hydrogen. Keep track of the counts of the atoms of carbon to oxygen and carbon to hydrogen.

Remember that you will want to use up all of the oxygen in the formation of either Methanol or Ethanol. There is going to be an equilibrium that will vary between the alcohols and the hydrocarbons. The oxygens may end up in longer chain alcohols like propanol and longer. This can only be determined experimentally. You need to calculate for at least enough methanol to consume the oxygens present. Oxygen in the form of water is HIGHLY undesirable. You must make sure that you have NO extra hydrogens from the overall favorable reaction.

Remember also that when introducing methane, you are chemically introducing a convenient form of hydrogen. There are four hydrogens per carbon in methane.

This is the highest for ANY organic molecule.

Gas {Carbon atom range} C1 and C2

Liquefied petroleum gas {Carbon atom range} C3 to C4 Gasolines {Carbon atom range} C4 to C10 (usually starts with pentane) Kerosines {Carbon atom range} C9 to C15 Middle Distillates {Carbon atom range} C12 to C20 Gas oils {Carbon atom range} C20 to C45

I dispute the first entry. My information is that liquefied natural gas begins with Ethane. Methane does not liquefy.

## ALCOHOLS

Methanol  $\text{CH}_3\text{-OH}$

Ethanol  $\text{CH}_3\text{-CH}_2\text{-OH}$

1-Propanol  $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-OH}$

2-Propanol  $(\text{CH}_3)_2\text{-CHO}$

1-Butanol

2-Butanol

2-Methyl-2-propanol

2-Methyl-1-propanol

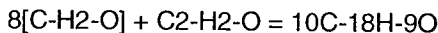
1-Pentanol  $\text{CH}_3(\text{CH}_2)_3\text{-CH}_2\text{-OH}$

1-Hexanol  $\text{CH}_3(\text{CH}_2)_4\text{-CH}_2\text{-OH}$

These are the only alcohols that are useful. The long chain alcohols would allow liquefaction of oxygen molecules with less consumption of methane.

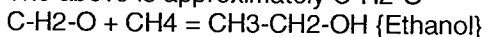
## Here is the math.

The polysaccharide components plus the 1/4 lignin dry plant contents break down to the following:



These are not molecular formulas, but ratios of one element to another.

The above is approximately  $\text{C-H}_2\text{-O}$



This reaction goes all the way to Ethanol with few other impurities.

## BY WEIGHT

$\text{C-H}_2\text{-O}$  is  $12 + 2 + 16 = 30$  {Atomic Numbers of the elements, only the protons and neutrons weigh anything}

CH<sub>4</sub> is 12 + 4 = 16

You have close to 1/3 of the weight of the reacting material being methane. It is just a little over 1/3 by weight. This is easy to remember.

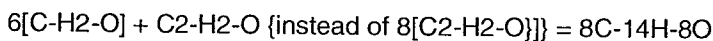
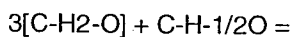
There is approximately one Carbon left over for every 9 molecules of Ethanol produced. This is one tenth of the carbon. That means that at the end of the reaction you will have either one tenth propanol in solution with the Ethanol, or you will have one tenth plus pentane. Pentane is soluble in Ethanol at 10%. The exact amount of Methane used will determine whether you have Propanol or Pentane for the impurity.

An interesting point is that you will have none of the shorter hydrocarbon chain molecules below Pentane. Pentane is white gasoline. Any hydrocarbon requiring pressure will react itself out of existence. Pentane is the first hydrocarbon that does not create pressure at room temperature. It is further disfavorable that sufficient Pentane be produced such as to come out of solution. This last is only slightly disfavorable. Pressure caused by Methane will still cause this reaction to occur spontaneously.

If you use too much Methane, you will end up with more Methanol and more Pentane, with that Pentane coming out of solution. It is possible to push the reaction to pure Methanol and pure Pentane. You will be using considerably more Methane to get this accomplished, but there will be absolutely no loss of btus in the reaction. It does go to completion. Pentane is the highest octane distillate of all of the gasolines.

At the end, the only impurities will be the micronutrients. It may be useful to precipitate those out for use as fertilizer. Contrary to common knowledge, micronutrients are as valuable or more valuable than traditional fertilizer mixes.

The polysaccharide building block plus the lignin building block at the dry weight existing ratio of 3 to 1.



3/4 is 6[ ] not 8[ ]. 8[ ] would be 4/5

However, this equation is resilient. It turns out that it only changes the resultant propanol percentage by 2%. The propanol percentage is now 12%, instead of 10%. This will also have an upwards revision of the pentane percentage, if the farmer chooses to add sufficient methane to create pentane.

The exact percentage compared to propanol is too complicated for me to assess (right now), but the volume (gallons) should be approximately the same.

Remember, it is possible to add sufficient methane to "push" the reaction to one half methanol and one half pentane. The reaction cannot be pushed farther than this without causing pressure.

The interesting thing about this last discovery is that it maps out a means to convert Ethanol, using methane, to one half methanol and one half pentane.

This is a desirable technique to know about. Most of the alcohol cars built, are built to burn methanol. There is VERY LITTLE technology out there that is directly for Ethanol. There are not even any direct Ethanol fuel cells, yet.

Direct means that they do not use a reformer.

It is possible to use a fuel cell on sugar water, by the way. There are some commercial exhibition kits that do so.

### NEW DEVICE COULD AID PRODUCTION OF ELECTRICITY

CAMBRIDGE, Massachusetts, November 30, 2001 (ENS) - A new semiconductor technology could allow efficient, affordable production of electricity from a variety of energy sources without a turbine or similar generator, says the research team responsible. Many scientists have worked to convert heat to electricity without the moving parts of a generator. Among other advantages, such a device would be almost silent, vibration free, and low in maintenance costs. But until now, the efficiency of such devices has been a problem. The amount of electricity they produce from a given amount of energy has been low. The new device is two times more efficient than its closest commercial competitor.

"That such good results were obtained in the first generation of the new device technology ... indicates that the general approach has great promise for improved performance in more mature implementations," write the researchers, associate professor Peter Hagelstein of Massachusetts Institute of Technology's Department of Electrical Engineering and Computer Science and Dr. Yan Kucherov of ENECO, Inc.

The new technology could turn waste heat from automobiles into electricity to augment or replace a vehicle's electrical and air conditioning systems. It could also boost the efficiency of stationary electric power plants. The technology is based on thermionics, launched a century old ago with the basic vacuum tube, a device that consisted of two parallel conductive plates separated by a vacuum gap. In this high temperature tube, electrons boiled off one plate, traversed the gap and then were absorbed into a colder plate. The conversion of heat to electricity "occurs as the electrons transport 'uphill' against an electric field in the gap region," said Hagelstein.

These early vacuum gap designs had high manufacturing costs and operating temperatures - above 1,000° Celsius (about 2,000° Fahrenheit) - which has limited the technology to nuclear powered converters in space probes, satellites and special military systems. The new technology replaces the traditional vacuum gap with a multi-layer semiconductor structure. Hagelstein and Kucherov demonstrated two basic physical mechanisms that allow the technology to be implemented.

"Solid state thermal to electric energy conversion converts energy due to how electrons transport in the conductor, a process that generates no pollution," Hagelstein said. He noted, however, that some of the materials used in the present generation of devices are toxic, which will affect the eventual disposal of the devices. The researchers presented their work at a poster session on Tuesday during the Materials Research Society's fall meeting in Boston.

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